Center for Scientific Review
National Institutes of Health

Scientific Areas of Integrated Review Groups (IRGs)

For a listing of the Scientific Review Administrator and membership roster for each study section, click on the study section roster under the study section name within the IRG listed below or go to the study section index(study sections listed alphabetically) and click on the specified roster next to the name of the study section.

Last updated on 30th June, 2004

Referral & Review

Molecular, Cellular, and Developmental Neuroscience IRG [MDCN]

Study sections of the Molecular, Cellular, and Developmental Neuroscience [MDCN] IRG review applications on the structure and function of neuronal, glial, and other excitable cells, as well as the development of both the central and the peripheral nervous systems, inclusive of the visual system and other excitable cells. Excitable cells, in addition to neural cells, include endocrine and neuroendocrine cells, pancreatic beta-cells, chromaffin cells, muscle cells, neuromuscular junctions, etc. Areas of interest include the functional characteristics of ion channels, the mechanisms by which extra- and intracellular signals are transduced and the functional characteristics of the transducers themselves, general mechanisms underlying the process of cell death, analyses of neural cell lineage, factors that specify or influence neuronal migration pathways or axonal pathfinding, processes that involve the maturation of neurons and glia, the formation of patterns and boundaries that lead to the development of adult brain regions and nuclei, and other aspects of the basic cellular and molecular physiology of neurons and glia. Projects reviewed in the MDCN IRG may be relevant to disorders or injuries, but their emphasis lies less in gaining an understanding of the disorder or its manifestations than on revealing the basic biological processes that underlie or may be altered in disorder.

In addition to this IRG, the Integrative, Functional, and Cognitive Neuroscience [IFCN] and Brain Disorders and Clinical Neuroscience [BDCN] IRGs within CSR focus on the review of neuroscience-related applications. Please see the descriptions and shared interest statements of these IRGs for a complete description of their review venues.

The following study sections are included within the MDCN IRG:

Synapses, Cytoskeleton and Trafficking Study Section [SYN] ***Formerly MDCN-1***
Neurodegeneration and the Biology of Glia Study Section [NDBG] ***Formerly MDCN-2***
Biophysics of Synapses, Channels, and Transporters Study Section [BSCT] ***Formerly MDCN-3***
Neurotransporters, Receptors, Channels and Calcium Signaling Study Section [NTRC] ***Formerly MDCN-4***
Molecular Neuropharmacology and Signaling Study Section [MNPS] ***Formerly MDCN-5***
Neurogenesis and Cell Fate Study Section [NCF] ***Formerly MDCN-6***
Neurodifferentiation, Plasticity, and Regeneration Study Section [NDPR] ***Formerly MDCN-7***
Special Emphasis Panel for the review of Neurotechnology, Neuroinformatics and Bioengineering Applications [SSS-E]
MDCN Small Business Activities [SBIR/STTR] Special Emphasis Panel [MDCN 10]
Special Emphasis Panel for the review of MDCN member conflict applications [SSS-P]

[Back to Top]

Synapses, Cytoskeleton and Trafficking Study Section [SYN]

Formerly MDCN-1

[SYN Roster]

The Synapses, Cytoskeleton and Trafficking [SYN] Study Section reviews applications on the basic cell biology of nerve, muscle and other excitable cells, including synaptic plasticity, protein and organelle trafficking, cell surface, and extracellular matrix molecules in cell recognition and function; and cytoskeletal functions across the life span. Emphasis is on fundamental mechanisms of excitable cell function, including those relevant to disease processes.

Specific Areas covered by SYN:

- Formation, regulation, maintenance, and dynamics of synaptic structure and function in the central and peripheral nervous systems
- Molecular neuronal mechanisms of endocytosis, exocytosis and membrane recycling; protein assembly, folding and targeting; organelle, protein, and mRNA localization and trafficking
- Structure, function, modification, assembly and regulation of cytoskeletal proteins and molecular motors; axonal and dendritic transport; neuronal polarity, growth cones, and structural plasticity; cytoskeletal pathology
- Regulation of extracellular space; cell surface, extracellular matrix, and, transmembrane components, and their function; cell recognition

SYN has the following shared interests within the MDCN IRG:

- SYN has shared interests with NDBG with respect to cytoskeletal pathology as related to neurodegenerative diseases. NDBG may be more appropriate if the emphasis is on the neurodegenerative aspects, but SYN may be more appropriate if the focus is more on cytoskeletal and/or trafficking issues.

- SYN has shared interests with BSCT with respect to synaptic function. BSCT has particular expertise in the structure and function of signal transduction molecules, but SYN may be more appropriate for more general studies of synaptic function.

- SYN has shared interests with NTRC with respect to the cellular regulation of transducer molecules. NTRC may be more appropriate if the focus is on the transduction pathway and electrophysiology, but SYN may be considered for studies relating to cellular neurobiology.

- SYN has shared interests with MNPS with respect to neurochemical and pharmacological aspects of cell physiology. MNPS may be more appropriate if the focus is on neurotransmitter function and regulation, but SYN may be considered for studies relating to cell trafficking and cytoskeletal interactions.

- Studies of plasticity associated with the establishment, maintenance, and reorganization of synaptic connections are appropriate for NCF or NDPR. Fundamental mechanisms of neuroplasticity may be reviewed in SYN. Studies related to cell surface and extracellular matrix molecules, when studied in a development context, may be reviewed in NCF or NDPR.

- SYN has shared interests with NDPR in the area of neuroplasticity. SYN focuses on fundamental

mechanisms of trafficking, basic cytoskeletal interactions, and synaptic function, including vesicular release, endocytosis, and receptor turnover. In contrast, NDPR focuses on developmental and regenerative events including process outgrowth and guidance, dendritic development, and synaptogenesis. Applications involving studies of cytoskeletal, cell membrane, or extracellular matrix components may be directed to SYN if they are focused on issues of trafficking or basic synaptic function and to NDPR if they are focused on developmental events or repair mechanisms.

SYN has the following shared interests outside the MDCN IRG:

- **With the Brain Disorders and Clinical Neuroscience [BDCN] IRG:** Study sections of the BDCN IRG review applications focused on a disease or disease process. Studies of disease processes may also be reviewed in SYN if they deal largely with the basic underlying cellular or molecular mechanisms.

- **With the Cell Biology [CB] IRG:** SYN has shared interests with the study sections of the CB IRG regarding general aspects of cell biology. Studies that address molecules and processes characteristic of the nervous system may be reviewed in SYN.

- **With the Integrative, Functional and Cognitive Neuroscience [IFCN] IRG:** The study sections of the IFCN IRG review research on cellular interactions in integrated circuits, systems, and behavior. SYN may be appropriate for studies of cellular and molecular phenomena within the context of a single cell, as well as cellular interactions involving cell surface and extracellular matrix molecules.

- **With the Brain Disorders and Clinical Neuroscience [BDCN] and Cell Biology [CB] IRGs:** Applications studying the visual system, but focusing on fundamental aspects of trafficking, cytoskeletal interactions and cell surface or extracellular matrix mo lecules, may be appropriate for SYN. If the focus of an application is on aspects especially characteristic of the anterior portion of the eye or the retina, it may be reviewed in the BDCN IRG or the CB IRG, respectively.

[Back to Top]

Neurodegeneration and the Biology of the Glia Study Section [NDBG]

Formerly MDCN-2

[NDBG Roster]

The Neurodegeneration and the Biology of the Glia [NDBG] Study Section reviews applications on neurodegeneration and programmed cell death; mapping novel transcripts and functional analysis of cloned gene products involved in cell survival or death; aspects of oxidative metabolism; glial-neuronal interactions [Schwann cells, oligodendrocytes, astrocytes, microglia]; mechanisms of glial differentiation, metabolism, and myelination; neuroimmune function across the life span. The roles of genetic factors, trophic molecules and extrinsic influences [including toxins, hormones, and addictive substances] in these processes, and aspects of disease, injury, repair and interventional strategies are considered.

Specific Areas covered by NDBG:

- Regulation of cell death and cell survival; functions and mechanisms of action of signaling molecules [such as neurotrophic factors, growth factors, cytokines] and electrical activity in regulating cell survival. Intracellular signaling pathways leading to apoptosis, and their intersection with the signal transduction pathways of survival factors
- Mechanisms in cell death due to aging, injury and environmental or genetic factors. This could include excitotoxins, free radicals, and neurodegenerative disease genes, as well as elucidation of excitotoxic,

necrotic, and apoptotic mechanisms; and studies of mechanisms relevant to the development of neuroprotective strategies, such as the administration of exogenous growth factors.

- Oxidative metabolism; special metabolic and energy demands of neurons and glia; relevant aspects of mitochondrial function and localization; aspects of mitochondrial dysfunction in disease states.
- Glial cell biology, neuroglial interactions, and myelination in the adult; growth factors and receptors involved in neuroglial function; synthesis, regulation and degradation of myelin; inductive signals for the initiation, maintenance, and degradation of myelin; remyelination processes
- Glial response to injury or infection, and immune function; inductive signals, phagocytosis [microglia], cross-reactivity of neuroimmune molecules and the immune response [e.g., cytokines, interleukins]

NDBG has the following shared interests within the MDCN IRG:

- NCF and NDBG both review studies of cell death. Studies that focus on the involvement of cell death in lineage restriction or patterning in the developing nervous system may be more appropriate for NCF. Studies of mechanisms of cell death per se may be more appropriate for NDBG. Studies of signaling molecules [e.g., growth factors] that affect multiple aspects of development may be appropriate for NDBG when the principal focus is on the role of these molecules in neuroprotection.

- NDPR and NDBG share review responsibilities regarding glial cell biology and regeneration following injury. Studies that focus on the role of glia in axon outgrowth, synapse formation, and morphological development of neurons may be more appropriate for NDPR. Studies that focus on glial cell biology, myelination, and response to injury may be more appropriate for NDBG. In the field of regeneration, studies focused on re-growth of axons or re-formation of synapses may be appropriate for NDPR while studies concerned with survival following injury and mechanisms of neurodegeneration may be more appropriate for NDBG.

NDBG has the following shared interests outside the MDCN IRG:

- **With the Brain Disorders and Clinical Neuroscience [BDCN] IRG:** (1) Study sections of the BDCN IRG may be appropriate for studies on pathogenesis, injury, and neuroimmune function; however, applications may be assigned to NDBG if the primary focus is on basic cellular and molecular mechanisms. Initial mapping and cloning of human disease genes that affect the nervous system may be reviewed by the BDCN IRG. (2) The BDCN IRG also has shared interests in the analysis of cloned gene products involved in cell survival or cell death. If the context of such a neuroscience application is disease, then BDCN may be appropriate for review. If the context of such a neuroscience application is basic science, then NDBG may be appropriate for review.

- **With the Biology of Development and Aging [BDA] and Cell Biology [CB] IRGs:** NDBG has shared interests with the BDA and CB IRGs in the area of cell death. NDBG may review applications that focus on neurons and glia, while the BDA and CB IRGs may review applications in the broader context of cell death.

- **With the Immunology [IMM] IRG:** NDBG has shared interests with the IMM IRG in the area of immune function. NDBG may be more appropriate when the emphasis is on neuroimmune interactions.

- **With the Integrative, Functional and Cognitive Neuroscience [IFCN] IRG:** NDBG has shared interests with the IFCN IRG regarding cellular interactions in integrated circuits, systems, and behavior, as follows: the neuronal basis of behavior; neuroendocrine and neuroimmune function; rhythms and oscillatory behavior; sensory systems; and motor function. If the focus is cellular or molecular, assignment may be to NDBG. If the focus is integrative, assignment may be to IFCN.

- **With the Genes, Genomes and Genetics [GGG] IRG:** If the focus of the application is on genetics with the nervous system as a model, the application may best be reviewed by the GGG IRG. Studies of

genomic screening, linkage analysis, and molecular genetic regulation may be reviewed in GGG unless the primary focus is on neural mechanisms or outcomes.

- **With the Brain Disorders and Clinical Neuroscience [BDCN] and Cell Biology [CB] IRGs:** Applications utilizing the visual system, but that focus on fundamental aspects of neurodegeneration, oxidative metabolism, or excitotoxicity may be reviewed in NDBG. Applications focused on the neurodegenerative aspects especially characteristic of the anterior portion of the eye or the retina may be reviewed by BDCN IRG or CB IRG, respectively.

- **With the Biology of Development and Aging [BDA] IRG:** NDBG has shared interests with the BDA IRG in the areas of cell cycle, aging and hormonal action. If the focus of the application is on re-entry into the cell cycle as a neuropathological event, on the cellular or molecular mechanisms in the nervous system, or on neuroprotection, the application may best be reviewed by NDBG; if the focus of the application is on other body systems, then the application may best be reviewed by the BDA IRG.

[Back to Top]

Biophysics of Synapses, Channels and Transporters Study Section [BSCT]

Formerly MDCN-3

[BSCT Roster]

The Biophysics of Synapses, Channels, and Transporters [BSCT] Study Section reviews applications on signal transduction in nerve, muscle, and other excitable cells, with the primary focus on the structure and function of the transducers themselves. This includes basic studies of subunit structure, molecular dynamics, gating and selectivity, and second-messenger cascades. General approaches may include molecular and structural biology, pharmacology, biophysics, electrophysiology, and protein chemistry, imaging and labeling techniques. Emphasis is on fundamental molecular mechanisms, including those relevant to disease processes.

Specific Areas covered by BSCT:

- Signal transduction molecules; voltage-gated and ligand-gated ion channels; neuromodulators; gap junctions and connexins; sensory transducers; transduction molecules in muscle, glia, and other non-neuronal cells
- Model systems; relevant studies in in vivo, tissue slices, tissue culture; molecular function in transgenic cells, cell lines, oocytes, and other expression systems; relevant approaches using in vitro systems; artificial lipid bilayers
- Protein structure and function; patch-clamp and whole-cell electrophysiology; structural biology; molecular modeling; constructs altered through molecular genetic and chemical means; membrane interactions
- Voltage dependence and ligand-gating, ionic selectivity; activation, inactivation, pharmacology, and other aspects of molecular regulation
- Coupling to second messenger pathways, including G-proteins and other enzymatic effectors; cyclic nucleotides and lipid metabolites; relevant enzyme pathways [kinases, phosphatases, phospholipases]

BSCT has the following shared interests within the MDCN IRG:

- BSCT has particular expertise in the structure and function of signal transduction molecules, but SYN may be more appropriate for more general studies of synaptic function.

- BSCT has shared interests with NTRC in the area of signal transduction. BSCT may be more appropriate for molecular, structural, and biophysical studies, while NTRC may be more appropriate for studies of cellular electrophysiology, synthesis and regulation of the transduction molecules, and most studies involving calcium pathways.

- BSCT has shared interests with MNPS in the area of signal transduction, especially with respect to second messenger pathways. BSCT may be more appropriate for molecular, structural, and biophysical studies, while MNPS may be more appropriate for neurochemical and pharmacological studies.

BSCT has the following shared interests outside the MDCN IRG:

- **With the Brain Disorders and Clinical Neuroscience [BDCN] IRG:** Study sections of the BDCN IRG may review basic and clinical research in neurological disorders and injury, but if the study involves fundamental cellular and molecular mechanisms in signal transduction, BSCT may have more appropriate expertise.

- **With the Cell Biology [CB] IRG:** (1) BSCT has shared interests with study sections of the CB IRG with respect to second messenger pathways and gap junctions. The CB IRG may review studies of kinase/phosphatase pathways and the regulation of cell growth, but BSCT may be more appropriate for studies where signal transducers lead to changes in phosphorylation/dephosphorylation of nervous system-specific proteins or other second-messenger functions unique to the nervous system. (2) The CB IRG may review research emphasizing the cell biology and biochemistry of gap junctions and connexins, while BSCT may be more appropriate for studies focusing on the electrophysiological and biophysical aspects of gap junctions, or when the emphasis is on cells of the nervous system. (3) The CB IRG may review research on muscle structure and contractile proteins; BSCT may be more appropriate for biophysical studies of signal transduction in neurons and synapses.

- **With the Cardiovascular Sciences [CVS] IRG:** The CVS IRG may review clinical aspects of cardiac muscle, especially in the context of heart disease, but BSCT may be more appropriate for biophysical studies of the signal transduction molecules.

- **With the Digestive Sciences [DIG] IRG:** Studies focusing on gut-specific signal transduction may be assigned to the DIG IRG. Studies focusing on general neuronal signal transduction in a gut-specific setting may be assigned to BSCT. Applications on neuroactive drugs may be assigned to BSCT if the primary focus is on neurotransduction mechanisms.

- **With the Biological Chemistry and Macromolecular Biophysics [BCMB] IRG:** The BCMB IRG may review studies of model membranes, protein structure and function, and structural biology. BSCT may be more appropriate when the focus is on structure/function of neuronal cell membranes, channels, receptors, etc., using biophysical techniques.

- **With the Integrative, Functional and Cognitive Neuroscience [IFCN] IRG:** (1) BSCT has shared interests with the IFCN IRG as follows: signal transduction in the context of integrated circuits, systems, and behavior, with particular expertise in neuronal basis of behavior; neuroendocrine and neuroimmune function; rhythms and oscillatory behavior; sensory function, and motor function. BSCT may be more appropriate for studies of transduction molecules at the structural and cellular level, including second messenger pathways. (2) The IFCN IRG may be more appropriate for most studies of long term potentiation [LTP] and long term depression [LTD] in learning, but applications on the biophysics of ion channels in LTP/LTD may be reviewed in BSCT.

- **With the Brain Disorders and Clinical Neuroscience [BDCN] and Cell Biology [CB] IRGs:** Applications to study the visual system but that focus on the molecular, structural, and biophysical

aspects of signal transduction molecules, or on voltage-gated or ligand-gated ion channels may be reviewed by BSCT. Applications focused on aspects especially characteristic of the anterior portion of the eye or the retina should be reviewed by BDCN IRG or CB IRG, respectively.

[Back to Top]

Neurotransporters, Receptors, Channels and Calcium Signaling Study Section [NTRC]

Formerly MDCN-4

[NTRC Roster]

The Neurotransporters, Receptors, Channels and Calcium Signaling [NTRC] Study Section reviews studies on signal transduction pathways in neurons, muscles, and other excitable cells with particular emphasis on cellular regulation and physiology. This includes studies on calcium physiology, regulation of ionic gradients, ion pumps and molecular transporters, ion channels, and synthesis and regulation of transduction mo lecules. Studies may integrate molecular, cellular, electrophysiological, and imaging approaches to examine molecular regulation, transduction, biochemical changes, cellular physiology, and functional consequences. Emphasis is on fundamental cellular mechanisms, including those relevant to disease processes.

Specific Areas covered by NTRC:

- Intracellular regulation of calcium; calcium channels, calcium storage, homeostasis, and buffering; calcium as a second messenger; electrophysiology; calcium imaging
- Ion pumps and molecular transporters; electrochemical coupling; maintenance of ionic gradients; membrane properties and electrodynamics; imaging studies
- Synthesis, insertion and regulation of transduction molecules; genetic regulation, transcription/translation, protein modification, localization, assembly, turnover, and degradation; local regulation of synaptic structure and function [i.e., insertion, accumulation, localization]
- Muscle cell electrophysiology and propagation of electrical signals

NTRC has the following shared interests within the MDCN IRG:

- If the focus is on fundamental mechanisms of neuronal cell function, the application may be reviewed in SYN. NTRC may be more appropriate for studies focusing on electrophysiology and transduction.

- NTRC has significant shared interests with BSCT in the area of signal transduction. NTRC may be more appropriate for studies of cellular electrophysiology, synthesis and regulation of the transduction molecules, and most studies involving calcium pathways, while BSCT may be more appropriate for molecular, structural, and biophysical studies.

- MNPS has significant shared interests in the area of signal transduction, especially with respect to second-messenger pathways. NTRC may be more appropriate for studies of cellular electrophysiology [especially involving calcium], while MNPS may be more appropriate for neurochemical and pharmacological studies.

NTRC has the following shared interests outside the MDCN IRG:

- **With the Brain Disorders and Clinical Neuroscience [BDCN] IRG:** The BDCN IRG may review

basic and clinical research in neural disorders and injury; however, if the study involves fundamental cellular mechanisms in signal transduction, NTRC may be more appropriate.

- **With the Cell Biology [CB] IRG:** The CB IRG may review studies of muscle structure and contractile proteins; NTRC may be more appropriate for electrophysiological studies of (neuronal) signal transduction.

- **With the Cardiovascular Sciences [CVS] IRG:** The CVS IRG may review clinical aspects of cardiac muscle, especially in the context of heart disease, but NTRC may be more appropriate for basic electrophysiological studies. CVS may also review skeletal muscle excitation-coupling [E-C coupling].

- **With the Digestive Sciences [DIG] IRG:** Studies on signal transduction by gut-neuroendocrine peptides may be assigned to the DIG IRG when the focus is on gut-specific actions.

- **With the Integrative, Functional and Cognitive Neuroscience [IFCN] IRG:** (1) The IFCN IRG may review signal transduction in the context of integrated circuits, systems, and behavior, as follows: the neuronal basis of behavior; neuroendocrine and neuroimmune function; rhythms and oscillatory behavior; sensory function; and motor function. NTRC may be more appropriate for studies of transport or transduction molecules at the cellular electrophysiological level. (2) The IFCN IRG, may be more appropriate for most studies of long-term potentiation [LTP] and long-term depression [LTD] in learning, but applications on the cellular and molecular basis of LTP/LTD may be reviewed in NTRC, especially if they involve intracellular calcium signaling or physiology.

- **With the Brain Disorders and Clinical Neuroscience [BDCN] and Cell Biology [CB] IRGs:** Applications studying the visual system but that focus on fundamental aspects of molecular transporters, ion pumps, and cellular electrophysiology, particularly involving calcium, may be reviewed in NTRC. Applications that focus on aspects that are especially characteristic of the anterior portion of the eye or the retina may be reviewed in BDCN IRG or CB IRG, respectively.

[Back to Top]

Molecular Neuropharmacology and Signaling Study Section [MNPS]

Formerly MDCN-5

[MNPS Roster]

The Molecular Neuropharmacology and Signaling [MNPS] Study Section reviews projects on neuronal and muscle signal transduction and neurotransmitters with a particular focus on neurochemical and pharmacological mechanisms. This includes studies of ligand interactions, neuromodulator interactions, neurotransmitter metabolism, and the development of therapeutic compounds. Emphasis is on fundamental cellular mechanisms, including those relevant to disease processes.

Specific Areas covered by MNPS:

- Pharmacological and neurochemical studies of ligand activation, G-protein coupling, and signal transduction cascades; studies of receptor agonists and antagonists; development of experimental and therapeutic approaches
- Neurotransmitter and neuromodulator pathways; enzyme function and regulation; regulatory mechanisms; metabolic plasticity within the cell; synaptic dynamics [release, diffusion, inactivation, re-uptake]
- Modulators of synaptic function, including growth factors, neurotrophins, neuropeptides, neurosteroids and neurotoxins; neurophysiology and neuropharmacology of modulatory mechanisms

- Ligand activation of second messenger pathways; pharmacological and neurochemical studies of ligand activation of G-proteins and other effectors

MNPS has the following shared interests within the MDCN IRG:

- SYN may be more appropriate for studies of exocytosis and cellular trafficking. MNPS may be more appropriate for studies focusing on neurotransmitter regulation and function.

- NDBG has shared interests with MNPS in the areas of energy and oxidative metabolism and excitotoxicity; NDBG may be more appropriate for studies focused on neurodegeneration or neuroprotection, while MNPS may be more appropriate for studies focused on metabolism and excitotoxic agents.

- BSCT has significant shared interests with MNPS in the area of signal transduction, especially with respect to second messenger pathways. BSCT may be more appropriate for molecular, structural, and biophysical studies, while MNPS has particular expertise in neurochemical and pharmacological studies of signal transduction.

- MNPS has significant shared interests with NTRC in the area of signal transduction. NTRC may be more appropriate for studies of cellular electrophysiology, synthesis and regulation of the transduction molecules, and most studies involving calcium pathways. MNPS has particular expertis e in neurochemical and pharmacological aspects of signal transduction.

MNPS has the following shared interests outside the MDCN IRG:

- **With the Brain Disorders and Clinical Neuroscience [BDCN] IRG:** The BDCN IRG may review basic and clinical research in neural disorders and injury, but if the study involves fundamental cellular and molecular mechanisms, MNPS may be more appropriate.

- **With the Biological Chemistry and Macromolecular Biophysics [BCMB] IRG:** MNPS and the BCMB IRG share interests in the area of receptor agonist/antagonist studies. If the focus is on chemical synthesis, BCMB may be more appropriate. If the focus is on receptor activation/inactivation in neural systems, MNPS may be more appropriate.

- **With the Cell Biology [CB] IRG:** MNPS has shared interests with the CB IRG with respect to studies of signal transduction and second messenger pathways. The CB IRG may review studies of kinase/phosphatase pathways and the regulation of cell growth, but MNPS may be more appropriate when the focus is on phosphorylation/dephosphorylation of brain-specific proteins or functions unique to the nervous system.

- **With the Cardiovascular Sciences [CVS] IRG:** The CVS IRG may review clinical research on cardiac muscle, especially in the context of heart disease; MNPS may be more appropriate for neurochemical and pharmacological studies of signal transduction molecules.

- **With the Endocrinology, Metabolism, Nutrition and Reproductive Sciences [EMNR] IRG:** The EMNR IRG has broadly shared interests with MNPS in the areas of neuropeptide/receptor interactions, second messengers and effectors, and neuro peptide processing enzymes. Studies of receptors for hypothalamic releasing or inhibiting factors or neuropeptide processing may generally be assigned to the EMNR IRG unless the focus is on signaling that is specific to neurons/glia.

- **With the Digestive Sciences [DIG] IRG:** Studies on signal transduction by gut-neuroendocrine peptides may be assigned to the DIG IRG when the focus is on gut-specific actions.

- **With the Integrative, Functional and Cognitive Neuroscience [IFCN] IRG:** (1) MNPS has shared interests with the study sections of the IFCN IRG regarding signal transduction in integrated circuits, systems, and behavior, as follows: drug effects on behavior; neuroendocrine and neuroimmune function; rhythms and oscillatory behavior; sensory function, and motor function. MNPS may be more appropriate for cellular studies of transduction molecules with particular emphasis on neurochemical and pharmacological approaches. (2) The IFCN IRG may be more appropriate for most studies of long-term potentiation [LTP] and long-term depression [LTD] in learning, but applications on the pharmacological basis of LTP/LTD may be reviewed in MNPS.

- **With the Brain Disorders and Clinical Neuroscience [BDCN] and Cell Biology [CB] IRGs:** Applications studying the visual system but that focus on neurochemical and pharmacological aspects of signal transduction may be reviewed in MNPS. Applications focused on aspects especially characteristic of the anterior portion of the eye or the retina may be reviewed in BDCN IRG or CB IRG, respectively.

[Back to Top]

Neurogenesis and Cell Fate Study Section [NCF]

Formerly MDCN-6

[NCF Roster]

The Neurogenesis and Cell Fate [NCF] Study Section reviews applications concerned with the initial formation of cells, as well as cell specification, determination, and differentiation in the developing nervous system. Areas to be included are: regulation of the cell cycle; induction of neural tissue; brain region specification and patterning; stem cell and progenitor cell proliferation, migration, and phenotypic determination; development and regulation of circadian rhythms and oscillatory processes; and neuronal and glial differentiation. There is emphasis on fundamental mechanisms underlying these processes in normal development, and in responses to disease, injury, and extrinsic factors, including circadian events and prenatal exposure to drugs.

Specific Areas covered by NCF:

- Regulation of the cell cycle; mechanisms of growth arrest and re-initiation of cell division and differentiation; initiation and regulation of circadian and oscillatory processes

- Fundamental cellular and molecular mechanisms of neural induction in normal development, including transcriptional regulation and signaling pathways; the cellular and molecular mechanisms through which the embryonic neural ectoderm acquires the characteristics of adult brain regions, including regionalization of gene transcription, cell-cell interactions, migration, circadian rhythmicity, and secreted signals that influence these events; effects of extrinsic factors, such as teratogens and drugs on these processes

- Neuronal and glial progenitors; cellular and molecular mechanisms of stem cell and progenitor cell induction, proliferation, migration, and phenotypic restriction; the influence of aging, extrinsic factors, disease and injury on these processes; characterization of stem cells for the purpose of repair following developmental and degenerative disease and injury

- Cell fate specification; effects of cell lineage, cell-intrinsic components [such as transcription factors], cell-cell interactions [before, during and after migration], secreted factors [such as growth factors,

cytokines, hormones, and neurotransmitters], and drugs on the phenotypic determination of neurons and non-neuronal cells, particularly glia

- Neuronal and glial cell differentiation and specialization; transcriptional and post-transcriptional regulation of the acquisition of the differentiated cellular and molecular characteristics of neurons and glia, including cell morphology, excitability, growth factor responsiveness and expression of specific neurotransmitters and their receptors; cell-cell interactions, among neurons and non-neuronal cells, such as glia and other cells participating in the development of the nervous system, leading to cell specializations such as myelin, and the development of specialized structures like the blood-brain barrier

- Circadian rhythm and other oscillatory processes; cell and molecular genetics producing rhythmicity, genomic mechanisms, pathways, transcripts, intracellular pathways, cell cultures, mutagenesis, regulation of clock-controlled genes, and the modulation of oscillatory functions

NCF has the following shared interests within the MDCN IRG:

- Applications dealing with fundamental mechanisms of neuroplasticity or with cytoskeletal functions and cell surface molecules may be reviewed in SYN. Studies of plasticity associated with the establishment, maintenance, and reorganization of synaptic connections may be appropriate for NCF.

- Studies of mechanisms of neuronal cell death per se may be appropriate for NDBG, but studies that focus on cell death in lineage restriction or patterning in the developing nervous system may be more appropriate for NCF. Studies of signaling molecules [e.g., growth factors] that affect multiple aspects of development may be appropriate for NCF when the principal focus is the role of these molecules in neural induction, specification, or differentiation.

- NCF and NDPR both review research on axonal projection patterns. Studies in which projection patterns serve as markers of cell identity or of nervous system regionalization may be more appropriate for NCF. Studies of mechanisms of axonal growth or establishment of connectivity per se may be more appropriate for NDPR.

- NCF and NDPR both review research on cell death. Studies that focus on the involvement of cell death in lineage restriction or patterning in the developing nervous system may be more appropriate for NCF.

NCF has the following shared interests outside the MDCN IRG:

- **With the Brain Disorders and Clinical Neuroscience [BDCN] IRG:** (1) Analysis of cloned gene products involved in neural induction, specification, or differentiation may be appropriate for NCF. However, studies on the developmental effects of prenatal exposure to drugs may be more appropriate for BDCN IRG if the focus is on the clinical aspects. (2) Studies using stem cells where the primary goal is to advance understanding of neural induction, specification, or differentiation are appropriate for NCF. Studies focused primarily on a restorative/therapeutic outcome may be appropriate for the BDCN IRG.

- **With the Biology of Development and Aging [BDA] IRG:** (1) Applications may be assigned to the BDA IRG if processes of non-neuronal cellular development are the focus. However, applications focused on the development of cell types that contribute to the formation of the nervous system may be assigned to NCF. (2) Applications that deal with general issues of the specification of cell fate or cellular biology may be reviewed by the BDA IRG. If the specific system is CNS- or PNS-based, the application may be reviewed in NCF. (3) Applications with an emphasis on general aspects of embryogenesis or morphogenesis may be more appropriate for the BDA IRG. Applications with a specific focus on nervous system development may be reviewed in NCF.

- **With the Genes, Genomes and Genetics [GGG] IRG:** Applications having a primary focus on genetics may be reviewed by the GGG IRG. Those applications dealing with genetics and genetic screening that address fundamental issues of neurodevelopment may be reviewed by NCF.

- **With the Biobehavioral and Behavioral Processes [BBBP]; Risk, Prevention and Health Behavior [RPHB]; and Health of the Population [HOP] IRGs:** Applications emphasizing the behavioral aspects of neural development, aging and injury may be reviewed in the behavioral IRGs [BBBP, RPHB, or HOP].

- **With the Integrative, Functional and Cognitive [IFCN] IRG:** (1) Studies on the effects of exposure to exogenous agents, disease, or trauma during development that focus on analysis of the organization, function or behavior of mature nervous systems rather than on fundamental processes involved in neural induction, specification, or differentiation may be more appropriate for the IFCN IRG. (2) Applications dealing with circadian rhythms and oscillatory processes that involve a largely systems approach may be reviewed in the IFCN IRG. NCF may be more appropriate if the focus is on molecular and cellular mechanisms. (3) Applications dealing with the functionality of the developing chemosensory, visual, auditory, or vestibular system and where specific knowledge of the systems is essential for review may be assigned to the IFCN IRG as follows: chemosensation; vision; or hearing or balance.

- **With the Genes, Genomes and Genetics [GGG] IRG:** (1) NCF and the GGG IRG have shared interests regarding cell cycle regulation and transcription. Applications that focus solely on cell cycle regulation and transcription may be assigned to GGG. (2) NCF reviews applications involving the molecular bases of neurogenetic development. If the focus of the application is genetics, with the nervous system being used as a model, the application may best be reviewed by GGG.

- **With the Brain Disorders and Clinical Neuroscience [BDCN] or Cell Biology [CB] IRGs:** Applications studying the visual system, but focusing on fundamental aspects of nervous system development, may be reviewed in NCF. Applications dealing with developmental aspects especially characteristic of the anterior portion of the eye or the retina may be reviewed in BDCN IRG or CB IRG, respectively. CB may be more appropriate for studies that focus on circadian rhythms as related to specifics of phototransduction mechanisms.

- **With the Biology of Development and Aging [BDA] IRG:** NCF shares an interest in regulation of gene expression, patterning, cell fate specification and stem cells with the BDA IRG. Studies focused on the nervous system in these areas may be best reviewed in NCF. Studies involving the nervous system that are focused on general mechanisms applicable to all organ systems may be reviewed in the BDA IRG.

[Back to Top]

Neurodifferentiation, Plasticity, and Regeneration Study Section [NDPR]

Formerly MDCN-7

[NDPR Roster]

The Neurodifferentiation, Plasticity, and Regeneration [NDPR] Study Section reviews applications focused on differentiation, plasticity, aging and regeneration of neuronal connectivity. This area includes process outgrowth, axon guidance, selection of synaptic targets, dendrite differentiation, establishment of neural maps, and formation and elimination of synaptic connections. Emphasis is on fundamental mechanisms underlying these processes in normal development and aging, and in response to disease, injury, and extrinsic factors, including prenatal exposure to drugs. The study section also reviews studies of the reestablishment of connectivity in aging, disease, and following injury, but with a focus on the analysis of cellular and molecular

mechanisms that stimulate, inhibit, or otherwise perturb process growth and synapse formation.

Specific Areas covered by NDPR:

- Substrates for neuronal and glial cell migration, including scaffolds; permissive and directional cues, and mechanisms through which they control cell motility, outgrowth and directional migration

- Cellular and molecular mechanisms, including signal transduction pathways that regulate axonal and dendritic outgrowth, fasciculation, branching and guidance; mechanisms regulating the selection of synaptic partners, including formation of topographic and laminar-specific projections

- Synapse formation and developmental plasticity. Initial formation and maturation of pre- and postsynaptic elements; mechanisms regulating the elaboration of arbors and retraction of processes, including the role of growth factors, cell-cell recognition molecules, electrical activity, and experience

- Regeneration of connections; positive factors [e.g., simulators of growth, directional cues, cell grafts (including stem cell grafts) and prosthetics] that can promote or direct axon sprouting, axon regrowth, and reestablishment of appropriate connections following injury; factors that inhibit these processes, and development of tools to overcome their effects

NDPR has the following shared interests within the MDCN IRG:

- SYN has shared interests with NDPR in the area of neuroplasticity. SYN focuses on fundamental mechanisms of trafficking, basic cytoskeletal interactions, and synaptic function, including vesicular release, endocytosis, and receptor turnover. In contrast, NDPR focuses on developmental and regenerative events including process outgrowth and guidance, dendritic development, and synaptogenesis. Applications involving studies of cytoskeletal, cell membrane, or extracellular matrix components may be directed to SYN if they are focused on issues of trafficking or basic synaptic function and to NDPR if they are focused on developmental events or repair mechanisms.

- NDBG reviews aspects of neurodegeneration, apoptosis, oxidative metabolism, neuroimmune function, and glial biology. These responsibilities are shared with NDPR in the areas of glial-neuronal interactions and repair following injury. Studies focused on mechanisms of neurodegeneration, neuronal survival, glial responses to injury, or myelination may be appropriate for NDBG. Studies on the role of glia in axon outgrowth, nerve regeneration , and synapse formation and studies examining spinal cord regeneration, peripheral nerve regeneration, and the restoration of synaptic function may be more appropriate for NDPR.

- NCF and NDPR have shared interests in the review of studies of axonal projection patterns. Studies in which axonal projection patterns are used as markers of cell identity or of nervous system regionalization may be more appropriate for NCF, while studies of mechanisms of axonal growth or establishment of connectivity per se may be more appropriate for NDPR.

- Studies of signaling molecules [e.g., growth factors] that affect multiple aspects of development are appropriate for NDPR when the principal focus is the role of these molecules in migratory events or in the establishment or modification of connectivity. Genetic screens [e.g., in invertebrate] that initially involve screening of non-developmental characteristics [such as the organization, function or behavior of mature nervous systems], may be appropriate for NDPR if the principal aim is to relate mutations to fundamental processes that regulate migratory events or the establishment or modification of connectivity.

NDPR has the following shared interests outside the MDCN IRG:

- **With the Brain Disorders and Clinical Neuroscience [BDCN] IRG:** NDPR has shared interests with the BDCN IRG regarding spinal cord and nerve regeneration. The BDCN IRG may be more appropriate for studies focused on clinical aspects of regeneration.

- **With the Cell Biology [CB] IRG:** The CB IRG reviews applications that focus on processes of cellular development other than those specific to neurons and/or glia. NDPR may be more appropriate if the system under study is CNS- or PNS-based. Review within the CB IRG is more appropriate if the main focus is cellular biology and physiology.

- **With the Biology of Development and Aging [BDA] IRG:** Applications that emphasize general aspects of embryogenesis or morphogenesis may be more appropriate for the BDA IRG. Applications with a specific focus on nervous system development may be reviewed in NDPR.

- **With the Biobehavioral and Behavioral Processes [BBBP]; Risk, Prevention and Health Behavior [RPHB]; and Health of the Population [HOP] IRGs:** The behavioral science IRGs [BBBP, RPHB, and HOP] review applications for which the focus is on behavioral aspects of neural development, aging and injury.

- **With the Integrative, Functional and Cognitive Neuroscience [IFCN] IRG:** (1) Studies of the neural basis of motivation and emotion may be reviewed in the IFCN IRG, unless the emphasis is on development, in which case NDPR may be more appropriate. (2) Studies of the regulation of brain activity and behavior by neuroendocrine and neuroimmune systems may be reviewed in the IFCN IRG unless the emphasis is on development, in which case NDPR may be more appropriate. (3) Studies of the regulatory and integrative activity on sleep, biorhythms, and the autonomic nervous system may be reviewed in the IFCN IRG unless the emphasis is on development, in which case NDPR may be more appropriate. (4) NDPR may review applications where a sensory system is used as a model to study principles of nervous system development. Applications requiring specific knowledge of the sensory system may be reviewed by the IFCN IRG. (5) NDPR may review applications where a motor system is used as a model to study principles of nervous system development. The IFCN IRG may review the application if the focus is specifically directed toward the motor system. (6) Applications that focus on fundamental aspects of the development of neural substrates of the auditory, vestibular, or visual systems may be reviewed by NDPR. Applications for which a specific knowledge of auditory, vestibular, or visual systems is essential for review may be reviewed by the IFCN IRG. (7) Studies of functional synaptic plasticity [such as synaptic efficacy, receptive field organization] associated with cognitive processes such as learning and memory may be reviewed by the IFCN IRG. Studies of plasticity associated with the establishment, maintenance, and reorganization of synaptic connections may be more appropriate for NDPR.

- **With the Genes, Genomes and Genetics [GGG] IRG:** NDPR may review applications involving the molecular bases of neurogenetic development. Applications focused on genetics with the nervous system may best be reviewed by the GGG IRG.

- **With the Brain Disorders and Clinical Neuroscience [BDCN] and Cell Biology [CB] IRGs:** Applications studying the visual system but that focus on fundamental aspects of nervous system development may be reviewed in NDPR. Applications focused on developmental aspects especially characteristic of the anterior portion of the eye or the retina may be reviewed in BDCN IRG or CB IRG, respectively.

- **With the Biology of Development and Aging [BDA] IRG:** NDPR shares an interest in cell polarity, differentiation and regeneration with the BDA IRG. Studies focused on the nervous system in these areas may best be reviewed by NDPR. Studies that involve the nervous system but are focused on general mechanisms applicable to all organ systems may best be reviewed in the BDA IRG.

[Back to Top]

ZRG1 MDCN-C Study Section

[ZRG1 MDCN-C Roster]

This special emphasis panel reviews neurotechnology, neuroinformatics and bioengineering applications within the areas covered by its chartered study sections.

ZRG1 MDCN-A Study Section

This special emphasis panel reviews applications that cannot be reviewed within the chartered MDCN study sections either due to member conflicts or to unique aspects of a given application.

MDCN Small Business Activities [SBIR/STTR] Special Emphasis Panel [MDCN 10]

[MDCN-10]

This special emphasis panel reviews SBIR / STTR applications within the areas covered by the MDCN IRG. The main focus is on the molecular and cellular level. In general, the projects involve development of devices, reagents, and software to probe channels, signal transduction, and the transducers themselves. Studies may involve basic biological processes that underlie or may be altered by disease processes. Examples of devices might include development of imaging and recording techniques; analytical and system controlling software; monitoring and assay platforms; neuroprosthetic devices; biosensors; and stem cells and cell culture systems. Projects might also focus on drug discovery and development; molecular manipulation and engineering; development of specific research reagents and assays; therapeutics; and proteins that interact with and modulate receptors, transporters and transducers.

]

[Referral & Review]

CSR Home Page